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South Carolina Cancer Health Equity Consortium: HBCU Student Summer Training Program

PRINCIPAL INVESTIGATOR:
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14. ABSTRACT

Background: There is a severe shortage of diverse biomedical scientists in the United States and in South Carolina. The goal of the South Carolina Cancer Health Equity Consortium: HBCU Student Summer Training Program is to provide a biomedical research training experience to **12** students (*i.e., "Student Fellows")* from three Historically Black Colleges/Universities – Claflin University, South Carolina State University, and Voorhees College over a three-year period. The major goals of the Training Program are: Goal 1.) To provide training in biomedical and prostate cancer research through the participation of four Student Fellows each year in a newly developed 15 credit hour prostate cancer health equity research course; Goal 2.) To conduct a hands-on research laboratory intensive with four Student Fellows each year. Each Student Fellow will complete a 10-week research project; Goal 3.) To provide the Student Fellows with clinical, cultural, and biotechnical learning opportunities through clinical shadowing experiences with physicians and/or other allied health care professionals; observations of a multidisciplinary prostate cancer tumor board; lay navigation shadowing in the clinical setting to gain experiences in the cultural and social context of prostate cancer treatment/survivorship issues; and interacting with biotechnical experts within the HCC shared resources/courses (*e.g.*, Cancer Genomics, Proteomics, Biorepository & Tissue Analysis, Flow Cytometry & Cell Sorting, Cell & Molecular Imaging, and Lipidomics); Goal 4.) To prepare tangible scientific products through extended mentoring with the Student Fellows such as scientific abstracts and research papers summarizing their prostate cancer research **Results:** During the current reporting period, **4** Student Fellows were identified, recruited to participate in the program, and admitted to the South Carolina Cancer Health Equity Consortium: HBCU Student Summer Training Program. The Student Fellows were matched with Research Mentors at MUSC, with whom they conducted research in the summer of 2015. Each Student Fellow prepared a scientific paper, gave a scientific presentation at the end of the summer program, and completed an 8-week Princeton Review Graduate Record Examination Test Preparation Course. **Conclusions:** State-of-the art comprehensive prostate cancer research education and training opportunities were provided to **4** Student Fellows from HBCUs in South Carolina. Each Student Fellow prepared a scientific paper and gave at least 1 scientific presentation. An additional Student Fellow was supported by leveraged funds. A cadre of developing scientists who are becoming well-prepared to conduct research spanning the continuum from basic science to clinical science to population-based research was developed.

15. SUBJECT TERMS

Prostate Cancer Research Training Program
Prostate Cancer Health Equity Research
Student Fellows from Historically Black Colleges and Universities (HBCUs)

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INTRODUCTION

Background

The South Carolina Cancer Health Equity Consortium: HBCU Student Summer Training Program (referred to as the Training Program) will provide a biomedical research training experience to 12 students from three Historically Black Colleges/Universities (HBCUs) – Claflin University (CU), South Carolina State University (SCSU), and Voorhees College (VC) over a three-year period (2015-2018). Undergraduate students from the three HBCUs (defined as Student Fellows) will participate in research intensive summer internships in the laboratories/research units of senior prostate cancer research scientists at the Medical University of South Carolina Hollings Cancer Center (MUSC HCC).

The didactic component of the 10-week Training Program includes an introduction to research on cancer disparities and prostate cancer. The Training Program also encompasses additional exposure to biomarker development, genetics, survivorship issues, and developmental therapeutics through shadowing experiences in the MUSC HCC's clinics, shared resources/cores, and greater interaction with the Sea Island/Gullah population of South Carolina. The ultimate goal of the Training Program is to increase the diversity of emerging scientists who may choose prostate cancer research careers in the basic, clinical, and population sciences.

Major Goals:

Goal 1: To provide training in biomedical and prostate cancer research through the participation of four Student Fellows each year in a newly developed 15 credit hour prostate cancer health equity research course.

Goal 2. To conduct a hands-on research laboratory intensive with four Student Fellows each year. Each Student Fellow will complete a 10-week research project.

Goal 3: To provide the Student Fellows with clinical, cultural, and biotechnical learning opportunities through clinical shadowing experiences with physicians and/or other allied health care professionals; observations of a multidisciplinary prostate cancer tumor board; lay navigation shadowing in the clinical setting to gain experiences in the cultural and social context of prostate cancer treatment/survivorship issues; and interacting with biotechnical experts within the HCC shared resources/courses (*e.g.,* Cancer Genomics, Proteomics, Biorepository & Tissue Analysis, Flow Cytometry & Cell Sorting, Cell & Molecular Imaging, and Lipidomics).

Goal 4: To prepare tangible scientific products through extended mentoring with the Student Fellows such as scientific abstracts and research papers summarizing their prostate cancer research.

Impact: Measurable outcomes of the Training Program will include the number of Student Fellows who take the Graduate Record Examination (GRE), apply to graduate school, and complete scientific presentations and publications based on their summer research projects. Efforts will also be made to evaluate long-term Training Program outcomes such as the number of Student Fellows who choose to pursue a medical or biomedical focused graduate and postgraduate career.

Program Director and Leadership Team

Dr. Marvella E. Ford is the Program Director. Drs. Omar Bagasra (CU), Judith Salley (SCSU), and Leroy Davis (VC) are Associate Directors. This four-person leadership team collaborates closely in the management and administration of the award, as well as the continued development and enhancement of the Training Program. The Program Director and Associate Directors share scientific interests in health disparities, serve in other leadership roles within their institutions, and meet frequently, both formally and informally. These individuals form the Executive Committee for the Training Program. Each institution has appointed Faculty Advisors consisting of Dr. Ewen McLean (CU), Dr. James B. Stukes (SCSU), and Mrs. Gayle Tyler Stukes (VC). Additionally, Dr. Kimberly Cannady (MUSC) serves as the Program Coordinator of the Training Program.

KEYWORDS: Prostate Cancer Research Training Program, Prostate Cancer Health Equity Research, Student Fellows from Historically Black Colleges and Universities (HBCUs)

BODY

Statement of Work

Task 1. Identify and Recruit the Student Fellows
(Year 1, months 1-3)

(a) Identify the pool of potential Student Fellows
(b) Interview the potential Student Fellows and select the best candidates
(c) Notify the selected Student Fellows of their acceptance into the Training Program
(d) Match the selected Student Fellows with their MUSC Research Mentors

Deliverables: Four Student Fellows were identified, recruited to participate in the Training Program, and matched with senior prostate cancer Research Mentors at MUSC.

Task 2. Provide Training in Biomedical and Prostate Cancer Research through a Newly Developed Prostate Cancer Health Equity Research Course and Laboratory Research Training Experience
(Year 1, months 6-8)

(a) Conduct a short-term education course in Prostate Cancer Health Equity Research
(b) Provide a short-term Laboratory Research Training Experience
(c) Sponsor the Student Fellows' participation in a Graduate Record Examination (GRE) Preparation Course

Deliverables: We provided cutting-edge comprehensive prostate cancer health equity research education and training opportunities for **4** students from three of South Carolina's HBCUs. We have developed a cadre of biomedical scientists who are well-prepared to contribute to future scientific discoveries related to prostate cancer screening, diagnosis, and treatment. Their research will span the spectrum from basic science to clinical science to population-based research. A minimum of 75% of the Student Fellows will take the GRE. At least 75% of the Student Fellows will apply to graduate school.

Task 3. Prepare Tangible Scientific Products through Extended Mentoring with the Student Fellows
(Year 1, months 10-12)

(a) Student Fellows will prepare and present scientific abstracts based on their prostate cancer research
(b) Student Fellows will prepare research papers summarizing their prostate cancer research

Deliverables: Five scientific presentations were conducted by Student Fellows. At least 2 peer reviewed publications are expected to result.

Task 4. Provide Student Fellows with Clinical, Cultural, and Biotechnical Learning Opportunities
(Year 1, months 6-8)

(a) Conduct a clinical shadowing experience with physicians and/or other allied health care professionals
(b) Provide an opportunity for Student Fellows to observe a multidisciplinary prostate cancer tumor board
(c) Offer lay navigation shadowing to provide experiences in the cultural and social contextual dynamics surrounding prostate cancer treatment/survivorship issues within the clinical setting
(d) Provide interactions with biotechnical experts within the Hollings Cancer Center shared resource/cores (*e.g.*, Cancer Genomics, Proteomics, Biorepository & Tissue Analysis, Flow Cytometry & Cell Sorting, Cell & Molecular Imaging, and Lipidomics)

Deliverables: Preparation for this task is underway and will be available to the students in the summer of 2016.

Task 5. Evaluate the Training Program

(a) Assess the number of applicants to the Training Program (Year 1, months 1-4)
(b) Count the number of Student Fellows who apply to graduate school and the number who are admitted to graduate school (Year 2, months 1-12; Year 3, months 1-12)
(c) Identify the number of scientific abstracts presented and peer-reviewed publications that result (Year 1, months 10-12)
(d) Survey the Student Fellows, Research Mentors, Principal Investigator, and Faculty Advisors at the end of each summer to provide feedback (Year 1, month 8)

Deliverables: Formative and summative evaluation of the Training Program is underway.

KEY RESEARCH ACCOMPLISHMENTS

Task 1. Identify and Recruit the Student Fellows
(Year 1, months 1-3)

(a) Identify the pool of potential Student Fellows
(b) Interview the potential Student Fellows and select the best candidates
(c) Notify the selected Student Fellows of their acceptance into the Training Program

To accomplish Tasks 1(a) – 1(c), Dr. Ford, the Program Director, worked with Associate Directors Dr. Omar Bagasra (CU), Dr. Judith Salley (SCSU), and Dr. Leroy Davis (VC) as well as Faculty Advisors Dr. Ewen McLean (CU), Dr. James Stukes (SCSU), and Mrs. Gayle Stukes (VC) to identify potential Student Fellows. Teleconferences were held quarterly with members of the Leadership Team to discuss student recruitment methods. The Associate Directors and Faculty Advisors then issued a call for applicants to their student bodies and personally approached students whom they felt would be outstanding applicants for the summer research program.

For example, to broaden the pool of potential applicants, each Associate Director invited faculty and students from his/her institution to participate in the Ernest Just Symposium held on February 27, 2015 at MUSC. A total of 194 students representing 13 different colleges and universities participated. A total of 32 students from HBCUs in SC participated in the Symposium, as well as 80 students from HBCUs in other regions of the country. Drs. Bagasra and McLean from CU were instrumental in recruiting as 19 students attended the Symposium from Claflin University. The students who participated in the Symposium also received a tour of scientific research units at MUSC and met with MUSC faculty members who could become their future research mentors. The agenda and number of students from each institution are included in **Appendices A-B.**

After the students applied, the Program Director, Associate Directors, and Program Coordinator reviewed their applications. The 4 selected students were accepted based on the following criteria: 1) Minimum GPA of 3.0; 2) Rising Junior or Senior; 3) Two letters of recommendation; 4) University Transcript; 5) Personal Statement indicating a desire for a research career; and 6) Willingness to complete the entire 10-week Summer Program. The 4 selected Student Fellows include: 1 male (non-Hispanic Black/African American) and 3 females (non-Hispanic Black/African American).

(d) Match the Student Fellows with their Research Mentors at MUSC

Once selected, the 4 Student Fellows were matched with Research Mentors at MUSC. The Leadership Team examined the expressed research interests of the Student Fellows as stated in their written MUSC Summer Undergraduate Research Program (SURP) applications and matched the students' stated research interests with those of available MUSC mentors, based on information contained in the mentors' biosketches. Upon matching, Dr. Ford sent an email to each mentor that contained descriptive information pertaining to their selected Student Fellow.

Task 1 Deliverables: Four Student Fellows (plus an additional student who was supported using leveraged funds) were identified, recruited, and admitted to the South Carolina Cancer Health Equity Consortium: HBCU Student Summer Training Program. The Student Fellows were matched with MUSC Research Mentors, with whom they conducted research in the summer of 2015.

Task 2. Provide Training in Biomedical and Prostate Cancer Research through a Newly Developed Prostate Cancer Health Equity Research Course and Laboratory Research Training Experience
(Year 1, months 6-8)

The Student Fellows participated in an intensive training program in the Basics of Research Design and Methods through participation in the MUSC Summer Undergraduate Research Program (SURP). The following table shows the SURP curriculum from 2015.

2015 SURP CURRICULUM
8:30-9:30 AM (unless otherwise noted)

MANDATORY Attendance for All
Orientation and Responsible Conduct of Research Sessions - LOCATION BSB 302

June 1 Mon **MANDATORY**: 9:00am Orientation and Intro to MUSC SURP — Stephanie Brown-Guion, MSM

All summer undergraduate research trainees are required to participate in Responsible Conduct of Research (RCR) Training, which is given the first week of the summer program. The class meets two hours a day for four days (total 8 contact hours) and attendance is monitored with sign-in sheets. The course director and MUSC Research Integrity Officer, Dr. Edward Krug, has developed and taught this course with the particular needs of undergraduate students interested in biomedical careers. Students are polled prior to the sessions to help understand the demographics of the class: career objectives, anticipated challenges, etc. to help focus the sessions to address their ethical concerns about biomedical research and level of understanding of responsible research practices. The format for most of the sessions is a short lecture followed by small group discussion of case studies facilitated by faculty and senior postdocs. The whole group then discusses key features of the case with a summary of the main issues by the instructor. Literature and on-line resources are provided to encourage continued study of each topic. All lectures and handout materials are archived on the CGS web page for future reference.

The schedule for Summer 2015 is shown below:

Date	***Topic***	***Lecturer***
June 2	**9-9:50am** Responsible Lab Citizenship & Mentoring (lecture/discussion) **9:50-10am** - - - Break- - - **10-10:50am** Data Management/Data Manipulation (lecture & case study discussion)	Ed Krug, PhD
June 3	**8:30-9:30am** Public Perceptions of Scientific Research ("And the Band Played On" video) **9:30-9:40am** - - -Break- - - **9:40-10:20am** Questionable Research Practices (lecture and discussion of video scenarios)	Ed Krug, PhD
June 4	**8:30-9:20am** Authorship and Plagiarism (lecture/case study/discussion) **9:20-9:30am** - - -Break- - - **9:30-10:10am** Animal Use in Research (lecture & discussion)	Ed Krug, PhD Alison Smith, DVM
June 5	**8:30-9:20am** Moral Reasoning in Ethical Dilemmas (lecture & case study/discussion) **9:20-9:30am** - - -Break- - - **9:30-10:10am** Research Misconduct/Whistleblower Protections (lecture/case study/discussion) **10:10-10:20am** Closing Comments/Exit Evaluation	Ed Krug, PhD

Outside Assignment: Complete the University of Montana On-Line RCR training (link below) - you must score a minimum of 70% on all quizzes. **Submit completion certificates only, to Stephanie Brown-Guion Bioengineering Bldg Room 101F no later than 4 PM Friday, June 12**

Further detail on how the topics are covered is presented below:

Questionable Research Practices - We use the HBO video "And the Band Played On" to demonstrate the potential impact of questionable research practices. This film, which is about the discovery of HIV, is effective at showing how non-scientific aspects of research, e.g. political, social and professional issues, can have overwhelming impact.

Moral Reasoning in Resolving Conflicts - Participants are introduced to the moral reasoning strategies for resolving ethical dilemmas, using the classic "Heinz and the Druggist" case as a training exercise. The moral reasoning strategy is then applied to scenarios from the "Band Played On" video to discuss how the moral reasoning approach to conflict suggests alternative actions that might have better contained the outbreak of HIV from the onset. Discussion of all case studies throughout the rest of the session is based on applying the tenets of moral reasoning – identify the points of conflict, identify the interested parties and assess their legitimate expectations and potential actions, determine the potential outcomes of those actions, and finally assess the moral basis behind each.

Data Management - The responsibilities for maintain a valid data record and associated research materials is discussed, along with issues of data manipulation, data selection, and ownership of the data record. Case studies and literature reports are used for small group discussions.

Authorship, Peer Review and Plagiarism - As publications are the "currency" of science they are often the source of most conflicts between the postdoc and principal investigator based on faulty assumptions of what constitutes justification for authorship. This session addresses issues such as when and how to discuss authorship practices, generally acceptable criteria for inclusion, and the potential ramifications of "honorary" authorship. Case studies regarding confidentiality in the peer review of manuscripts and grants are discussed, as well as proper mechanisms for involving third parties in the process. The potential consequence of plagiarism is emphasized.

Animals Use in Research - There are several key issues covered in this interactive lecture given by one of the faculty in the Division of Laboratory Animal Resources: prevalence of animal use in research, why it is important, how it is regulated, training requirements and educational opportunities, and a brief virtual tour of MUSC facilities. Animal rights issues are discussed openly to make students aware of important issues. Case studies are used to highlight frequent infractions and misconceptions of animal use.

Reporting Misconduct and Whistleblower Protections - The instructor explores the HHS ORI, MUSC ORI, and other websites to highlight available resources and demonstrate the potential disciplinary actions for misconduct. Literature is used that describes how a finding of misconduct affects others in the laboratory, and steps that principal investigators have taken in response to minimize possible future events. Whistleblower rights and means for reporting misconduct are presented. The University of Alabama's web-based Research Misconduct Training module "Amanda's Dilemma" is used to stimulate group discussion.

2015 SURP CURRICULUM
MANDATORY LECTURES WEEKS 2 - 7

The following lectures in Black Font require mandatory attendance for everyone regardless to your research area. These are held on Monday, Wednesday, and Friday.

Lecture Time: 8:30-9:30; Location: 302 BSB (unless otherwise noted)

Date		*Topic*	*Lecturer*
June 8	**Mon**	Novel Therapies to Treat Acute Kidney Injury: From Bench to Bedside	Dr. Rick Schnellmann, PhD
June 10	**Wed**	Human Subject Protection SCTR SUCCESS Center: Scientist Support for Conducting Research	Susan C. Sonne, PharmD Stephanie Gentilin, MA, CCRA
June 12	**Fri**	Example of Translational Research: Thromboxane Receptors in Bladder Cancer	Perry Halushka, PhD, MD
June 15	**Mon**	Hepatic Steatosis in a Growing World: The Impact On Transplantation	Kenneth Chavin, MD, PhD
June 17	**Wed**	Recombinant DNA	David Kurtz, PhD
June 19	**Fri**	Proteomics Technology	Lauren Ball, PhD
June 22	**Mon**	Cell Biology – Tissue Ultrastructure	Debra Hazen-Martin, PhD
June 24	**Wed**	Developmental Biology	Michael Kern, PhD
June 26	**Fri**	Transcription	Steven Kubalak, PhD
June 29	**Mon**	Lipidomics	Ashley Cowart, PhD
July 1	**Wed**	Microarray Analysis	Jeremy Barth, PhD
July 6	**Mon**	Confocal/Multiphoton Microscopy of Living Cells And Tissues	John Lemasters, MD, PhD
July 8	**Wed**	Receptors	Steven Rosenzweig, PhD
July 10	**Fri**	G Proteins	John Hildebrandt, PhD
July 13	**Mon**	Stem Cells	Amanda LaRue, PhD

SPECIALIZED TRACKS

NOTE: The following color-coded schedule are lectures specific to your research area. If you were not accepted into a specific lecture track you will select one based on your research area and attend those lectures for the remaining summer lecture hours. The specialized areas lectures are Cancer, Cardiovascular, Neuroscience Oral Health Sciences and Marine Biomedicine & Environmental Health.

- **These lectures are held on Tuesday and Thursday with the exception of two lectures for Marine Biomed.**

Key: **Black – mandatory for everyone**
Red – Cancer track
Dark Blue – Cardiovascular track
Green – Neuroscience track
Pink – Oral Health Sciences track ***Lecture will be held at 8:00am-9:00am
Blue - Marine Biomedicine & Environmental Health

CANCER

Library Room 104			
June 11	Thur	Cytogenetics Cancer Cell Cycle	Daynna Wolff, PhD Cynthia Wright, PhD
June 16	Tue	Kinds of Cancer	Robert Gemmill, PhD
June 18	Thur	Smoking & Cancer	Michael Cummings, PhD
June 23	Tue	Epidemiology of Cancer	Kristin Wallace, PhD (Dr. Linda Kelemen)
June 25	Thur	Cancer Chemotherapy	David Kurtz, PhD
June 30	Tue	Cancer Disparities	Marvella Ford, PhD

CARDIOVASCULAR TRACK

Library Room 115			
June 9	Tues	Atherosclerosis	Samar Hammad, PhD
June 11	Thur	Electrical Properties of the Heart	Rupak Mukherjee, PhD
June 16	Tue	The Heart	Perry Halushka, PhD, MD
June 18	Thur	Aspirin & NSAIDS	Perry Halushka, PhD, MD
June 23	Tue	Arterial Pressure Control & High Blood Pressure	Perry Halushka, PhD, MD
June 25	Thur	Imaging the Heart	Joseph Schoepf, MD
June 30	Tue	Renal Regulation of Homeostasis	Ed Soltis, PhD

NEUROSCIENCE

Basic Science Bldg. Room 302			
June 9	Tue	Retinoids & Vision	Masahiro Kono, PhD
June 11	Thur	Dementia	Mark Kindy, PhD
June 16	Tue	ADD/ADHD	Antonieta Lavin, PhD Jonathan Dilgen, PhD
June 18	Thur	Spinal Cord Injury	Narendra Banik, PhD
June 23	Tue	Neuroimaging Lab Demonstration	Colleen Hanlon, PhD **LECTURE CANCELLED**
June 25	Thur	Addiction & Alcohol	Corrigan Smothers, PhD **LECTURE CANCELLED**
June 30	Tue	Your Brain, Stress, and Anxiety	Arthur Riegel, MD
July 2	Thur	Addiction & Drugs	Patrick Mulholland, PhD

ORAL HEALTH SCIENCES

Basic Science Bldg. Room 252			
June 9	Tue ***8:00 AM	Overview of Dentistry & Dental Materials	Joe Vuthiganon, DMD
June 11	Thur	Temporomandibular Joint Biomechanics	Hai Yao, PhD
June 16	Tues	Oral Health Community Engagement	Renata Leite, DDS
June 18	Thur	Tooth Development	Michael Kern, PhD
June 23	Tue	Periodontal Disease	Heidi Steinkamp & Keith Kirkwood, DDS, PhD
June 30	Tue	Oral Infections	Caroline Westwater, PhD
July 2	Thur	Craniofacial Anomalies	Michael Kern, PhD
July 7	Tue 8:00 AM	Oral Pharyngeal Cancer	Boyd Gillespie, MD***

MARINE BIOMEDICINE & ENVIRONMENTAL HEALTH SCIENCES

Fort Johnson MBES White House			
June 11	Thur 10-11am	Eco-Toxicology: Endocrine Disruptors & Other Environmental Contaminants Faculty	Dr. Louis Guillette, MUSC
June 25	Thur 9-10:30am	Ecotoxicology and Algae Toxins	Dr. Peter Moeller, NOS
July 2	Thur 9-10:30am	Marine Bio-toxins	Dr. Fran Van Dolah, NOAA
July 10	Fri 11am-12pm	MBEH OPEN HOUSE – Lecture: EDCs and fish health at water treatment facilities	Dr. Charles Tyler, University of Exeter
July 14	Tue 10-11am	Comparative Genomics	Dr. Andy Shedlock, CofC
July 22	Wed 10-11am	Lipidomics and Environmental Health	Dr. John Bowden, NIST

(a) Conduct a short-term education course in Prostate Cancer Health Equity Research

The Student Fellows in the Training Program participated in an intensive 10-week training program in Prostate Cancer Research. Lectures focused on population science, statistical methods in prostate cancer research, prostate cancer clinical research, and basic science research. In addition, as prostate cancer is a hormone-related cancer and some of the biological mechanisms that influence the etiology and treatment of prostate cancer are also relevant to breast cancer, the curriculum included information pertaining to breast cancer as well. Disparities research was a cross-cutting theme in all of the lectures.

The structure of the curriculum also provided the students with a better understanding of the different population groups that were included in their research. Therefore, cultural enrichment activities were added to the curriculum, such as the Gullah tour of St. Helena, in order to expose the students to the local and historic culture of the St. Helena population. The Sea Island (Gullah) population is a subpopulation of African Americans indigenous to the coastal regions of the eastern seaboard. They are one of the most genetically homogeneous groups of blacks in the U.S. Their particularly low rate of European American genetic admixture makes this a unique population for basic, clinical and population-based research.

To foster the professional development of the Student Fellows, the lectures included discussions of funding opportunities available to students, career development opportunities, qualitative research methods, perspectives of prostate cancer among community members, and tips for preparing graduate school applications. In addition, the Student Fellows participated in etiquette training to gain the tools needed to successfully navigate through their professional careers.

The Training Program schedule also provided time for students to rehearse their research presentations and gain input from their mentors and other scientists at the HCC. The following table shows the cancer research training curriculum for 2015.

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2015 BREAST AND PROSTATE CANCER
SUMMER UNDERGRADUATE RESEARCH TRAINING CURRICULUM
June 1, 2015 - July 31, 2015
11:00 a.m. - 12:00 pm

June Schedule

Week	Topic	Instructor	Location and Date
WEEK 1	Welcome and Overview of the Training Program	**Leadership, Mentors and Planning Team**	**Tuesday, June 2, 2015 BEB 402**
WEEK 1 (Clinical Science Research Lecture)	Controversies in Prostate Cancer Screening	**Steven Savage, M.D. Professor & Vice Chairman of Urology**	**Tuesday, June 2, 2015 BEB 402**
WEEK 1 (Basic Science Lecture)	Genetic Basis of Cancer	**Dennis Watson, Ph.D. Professor Pathology & Laboratory Medicine**	**Thursday, June 4, 2015 *BS 202**
WEEK 2 (Clinical Science Research Lecture)	Controversies in Breast Cancer Screening	**Madelene Lewis, M.D. Assistant Professor Radiology**	**Tuesday, June 9, 2015 BEB 402**
WEEK 2 (Academic Planning Lecture)	Funding Opportunities for Underrepresented Minority Scholars	**Joann F. Sullivan, Ph.D. Assistant Dean for Extramural Program Development**	**Thursday June 11, 2015 *BS 202**
WEEK 2 (Cultural Enrichment Activity)	Cultural Enrichment Activity	**Cultural Enrichment Event**	**Saturday, June 13, 2015**
WEEK 3 (Basic Science Lecture)	Breast Health and Breast Disease, The Basics	**Lindsay Peterson, M.D. Assistant Professor Hematology/Oncology**	**Tuesday, June 16, 2015 *DD 111**
WEEK 3 (Cultural Enrichment Activity)	Etiquette Training	**Cultural Enrichment Event**	**Thursday, June 18, 2015 BEB 402**
WEEK 4 (Clinical Science Research Lecture)	Anatomy and the Function of the Prostate	**Harry S. Clarke, M.D., Ph.D. Professor Urology Services**	**Monday, June 8, 2015 *BS 202 *12:00 pm**
WEEK 4 (Basic Science Lecture)	Receptor Crosstalk Leading To Cancer Cell Invasion	**Steven Rosenzweig, Ph.D. Professor Pharmacology**	**Tuesday, June 23, 2015 BEB 402**
WEEK 4 (Biostatistical Methods Lecture)	Biostatistical Issues in Breast and Prostate Cancer Research	**Elizabeth Garrett-Mayer, Ph.D. Professor Public Health Sciences**	**Thursday June 25, 2015 *BE 112**
WEEK 5 (HCC Outreach Lecture)	Hollings Cancer Center Outreach Mobile Unit & Community Compass	**Melanie Slan Program Coordinator Outreach Services**	**Tuesday June 30, 2015 BEB 402**

CORE LECTURE **BREAST CANCER LECTURE** **PROSTATE CANCER LECTURE**

2015 BREAST AND PROSTATE CANCER
SUMMER UNDERGRADUATE RESEARCH TRAINING CURRICULUM (continued)
June 1, 2015 - July 31, 2015
11:00 a.m. - 12:00 pm

July Schedule

Week	Topic	Instructor	Location and Date
WEEK 6 (Basic Science Lecture)	Tissue Biorepository	**Kiwana Gibbs, MA Operations Manager of Tissue Biorepository and Analysis**	**Monday July 6, 2015 BEB 402**
WEEK 6 (Tips for Preparing Graduate School Applications)	Improving Graduate School Admission Rates	**Cynthia F. Wright, Ph.D. Associate Dean for Admissions and Career Development**	**Tuesday July 7, 2015 *DD 111**
WEEK 6 (Population Science Research Lecture)	Community-Based Genetic Research Project Among The Sea Islanders (Gullahs) In SC	**Ida J. Spruill, Ph.D. Assistant Professor College of Nursing**	**Thursday, July 9, 2015 BEB 402**
WEEK 7 (Population Science Research Lecture)	Introduction to Public Health	**John Vena, Ph.D. Professor and Founding Chair Department of Public Health**	**Tuesday July 14, 2015 *DD 111**
WEEK 7 (Population Science/Epidemiologic Research Lecture)	Epidemiologic Issues in Prostate Cancer Research	**Anthony Alberg, Ph.D. Professor Cancer Control Program**	**Thursday July 16, 2015 BEB 402**
WEEK 7 (Cultural Enrichment)	Cultural Enrichment Event	**Cultural Enrichment Event**	**Saturday, July 18, 2015**
WEEK 8 (Clinical Research Lecture)	Vitamin D and Prostate Cancer	**Sebastiano Gattoni-Celli, M.D. Professor Radiation Oncology**	**Tuesday July 21, 2015 BEB 402**
WEEK 8 (Rehearsals)	Research Presentation Rehearsals	**Students**	**Tuesday July 21, 2015 BEB 402 *12:00 pm**
WEEK 8 (Population Science Research Lecture, Evaluations)	Survivorship Issues in Breast Cancer	**Katherine Sterba, Ph.D. Assistant Professor Cancer Control Program**	**Thursday July 23, 2015 BEB 402**
WEEK 8 (Rehearsals)	Research Presentation Rehearsals	**Students**	**Thursday July 23, 2015 BEB 402 *12:00 pm**
WEEK 9 (Rehearsals)	Research Presentation Rehearsals	**Students**	**Monday July 27, 2015 BEB 402 *1:00 pm**
WEEK 9	**End of Program Celebration**	**All Research Students and Staff**	**Tuesday July 2, 2015 HCC 124L *6:00 pm**

CORE LECTURE **BREAST CANCER LECTURE** **PROSTATE CANCER LECTURE**

*** - Denotes room or time change**

(b) Provide a short-term Laboratory Research Training Experience

The Student Fellows were matched with Research Mentors at MUSC based on their research areas of interest stated on their applications. The Student Fellows worked ~30-35 hours per week with their assigned mentors conducting research. The Research Mentors helped to shape the Student Fellows' summer experiences to ensure tangible outcomes – presentation of data results (preliminary or final), and submission of scientific abstracts and papers for peer review. The hands-on training involved learning/performing laboratory techniques, data collection and analytic methods, interviewing techniques, and data interpretation.

The following table shows the names of the students who participated in the 2015 South Carolina Cancer Health Equity Consortium: HBCU Student Summer Training Program, their Research Mentors at MUSC, and their research topics.

Summer 2015 South Carolina Cancer Health Equity Consortium: HBCU Student Summer Training Program Students, Mentors, and Research Topics

Student Name	Academic Institution	MUSC Research Mentor	Research Topic
Ms. Kadeidre Gaymon	SC State University	Marvella E. Ford, PhD	Evaluating Rates of Overweight/Obesity and Physical Activity in a Diverse Sample of South Carolina Cancer Survivors
Ms. Casseanna Holmes (Dual Year Participant 2014/2015)	Voorhees College	Danyelle Townsend, PhD	Impact of Antioxidant Enzymes on Breast Cancer Patients: An Evaluation of Triple Negative and Receptor Expression
Mr. Malik Leach	Voorhees College	David P. Turner, PhD	The Contribution of AGEs to Tamoxifen Resistance
Ms. Ludy Martinez	Claflin University	Shikhar Mehrotra, PhD	The Immunosuppressive Ability of Myeloid Derived Suppressor Cells on T Cells

In addition to the students listed above, the Program Director leveraged funding from another funding source to support an additional student **(Appendix C)**.

(c) Sponsor the Student Fellows' participation in a Graduate Record Examination (GRE) Preparation Course

In 2015, all **5** Student Fellows took the 10-week Princeton Review GRE Test Preparation Course. The Princeton Review is a standardized test preparation company. The course met on Wednesday evenings from 5:30 pm – 8:30 pm. The course seamlessly adjusts classwork and homework to the skill level of each student. This is accomplished by focusing on the areas where each student needs the most improvement. The course provides instruction in test-taking skills, and provides opportunities for dynamic group discussions and collaborative drills.

Task 2 Deliverables: In 2015, state-of-the art comprehensive prostate cancer research education and training opportunities were provided for **4** students from three of South Carolina's HBCUs. Funds were leveraged from other funding sources to provide the same level of education and training to an additional student from an

HBCU in South Carolina. We are developing a cadre of scientists who are well-prepared to play a significant role in discovering and testing new prostate cancer biomarkers. In the future, these investigators will likely conduct research spanning the continuum from basic science to clinical science to population-based research.

Task 3. Prepare Tangible Scientific Products through Extended Mentoring with the Student Fellows
(Year 1, months 10-12)

(a) Student Fellows will prepare and present scientific abstracts based on their prostate cancer research
(b) Student Fellows will prepare research papers summarizing their prostate cancer research

Summaries of each Student Fellows' research projects are included in **Appendix D**. Please note that the biological mechanisms that are included in the Student Fellows research have direct relevance/application to prostate cancer research.

In addition, each Student Fellow prepared a scientific research paper that will form the basis of a peer-reviewed publication. Each Student Fellow also gave a scientific presentation based on the results of his or her work.

Task 3 Deliverables: A total of 5 scientific presentations were made by the **4** DoD Student Fellows and the **1** additional Student Fellow who was supported through leveraged funds.

Task 4. Provide Student Fellows with Clinical, Cultural, and Biotechnical Learning Opportunities
(Year 1, months 6-8)

(a) Conduct a clinical shadowing experience with physicians and/or other allied health care professionals
(b) Provide an opportunity for Student Fellows to observe a multidisciplinary prostate cancer tumor board
(c) Offer lay navigation shadowing to provide experiences in the cultural and social contextual dynamics surrounding prostate cancer treatment/survivorship issues within the clinical setting
(d) Provide interactions with biotechnical experts within the Hollings Cancer Center shared resource/cores (*e.g.*, Cancer Genomics, Proteomics, Biorepository & Tissue Analysis, Flow Cytometry & Cell Sorting, Cell & Molecular Imaging, and Lipidomics)

To launch Task 4, after funding was received in July 2015, Dr. Ford contacted physicians, allied health care professionals, and the Director of the HCC Shared Resources to begin planning the clinical, cultural, and biotechnical learning opportunities. All individuals agreed to start this learning experience during the summer of 2016. The following table shows the schedule of electives that will be employed during the summer of 2016.

Task 4 Deliverables: The 2016 South Carolina Cancer Health Equity Consortium: HBCU Student Summer Training Program Elective Schedule is below.

	June 10, 2016	June 17, 2016	June 24, 2016	July 8, 2016	July 15, 2016
Biorepository & Tissue Analysis • BE 421 – 3:30 PM	**Group A**	**Group C**	**Group B**	**Group D**	**Group E**
Cell & Molecular Imaging Core Facility • DD 507 – 2:00 PM	**Group B**	**Group A**	**Group D**	**Group E**	**Group C**
Flow Cytometry and Cell Sorting Core • HCC 324 – 2:00 PM Take the elevators near the Director's Suite (across from the piano) to access the 3rd floor.	**Group E**	**Group D**	**Group C**	**Group B**	**Group A**
Genomics • BE 433 – 11:00 AM	**Group C**	**Group B**	**Group E**	**Group A**	**Group D**
Lipidomics • CRI 505c – 10:00 AM CRI - Children's Research Institute	**Group D**	**Group E**	**Group A**	**Group C**	**Group B**

Task 5. Evaluate the Training Program

(a) Assess the number of applicants to the Training Program (Year 1, months 1-4)

In the spring of 2015, 6 students from South Carolina's HBCUs applied to the South Carolina Cancer Health Equity Consortium: HBCU Student Summer Training Program. As planned, four Student Fellows were selected to participate in the Training Program. An additional Student Fellow was selected who was supported through leveraged MUSC HCC funds.

(b) Count the number of Student Fellows who apply to graduate school and the number who are admitted to graduate school (Year 2, months 1-12; Year 3, months 1-12)

The Student Fellows who participated in the 2015 South Carolina Cancer Health Equity Consortium: HBCU Student Summer Training Program were rising sophomores through seniors. To monitor the Student Fellows' progression through their academic careers, we are actively keeping track of their progress using the strategies that are described below.

1. Searching the MUSC graduate program databases to identify whether any of the students applied, were offered, or accepted positions at MUSC.
2. Contacting the participating universities' alumni offices.
3. Employing other internet-based search tools/communications (Google, Twitter, Facebook, and Historically Black College/University Connections, *etc.*) to identify students' current locations, contact information, and academic achievements (Year 3 and beyond)

We have implemented several steps for tracking student scientific progress. Communication and assistance from the Associate Directors and Faculty Advisors have proved to be very effective. Additionally, social media tools such as Facebook have also been useful for engaging the students and opening a venue for communication. Another method we have found useful is text messaging. We have found that students respond more quickly to text messages than to emails and telephone calls. We will utilize and build upon these methods

to improve continued student tracking. These multiple tracking strategies will be used to update the table that is included in **Appendix E**, which lists the academic accomplishments of the Student Fellows.

(c) Identify the number of scientific abstracts presented and peer-reviewed publications that result (Year 1, months 10-12)

The Student Fellows gave a total of 6 scientific presentations. One student from Claflin University, Ms. Ludy Martinez, was awarded a travel scholarship to present her scientific research at the Annual Biomedical Research Conference for Minority Students in Seattle, Washington. The mentors of the Student Fellows have confirmed that they are actively writing manuscripts that will include some of the Student Fellows as co-authors.

(d) Survey the Student Fellows, Research Mentors, Principal Investigator, and Faculty Advisors at the end of each summer to provide feedback (Year 1, month 8)

At the end of the program, the Student Fellows completed Training Program evaluations. The results from the 2015 Student Fellows are presented in the following table. This table includes an evaluation from the student who was supported by leveraged funds. The Leadership Team has identified an instrument that will be completed by Research Mentors in the 2016 program, to evaluate the program from the perspective of the mentors. The instrument is included in **Appendix F**.

SUMMARY RESULTS OF STUDENT EVALUATIONS 2015 (n=5)										
Survey Item	**Strongly Disagree**		**Disagree**		**Not Sure**		**Agree**		**Strongly Agree**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
1. Overall, the summer program was a good research experience.	0	0.0	0	0.0	0	0.0	**2**	**40.0**	**3**	**60.0**
2. The summer program helped me learn the fundamentals of breast and prostate cancer and research.	0	0.0	0	0.0	0	0.0	**2**	**40.0**	**3**	**60.0**
3. The Princeton Review Graduate Record Examination (GRE) Course was effective in helping me to learn GRE test preparation strategies.	0	0.0	0	0.0	**1**	**20.0**	**2**	**40.0**	**2**	**40.0**
4. The seminar schedule was convenient.	0	0.0	0	0.0	0	0.0	**2**	**40.0**	**3**	**60.0**
5. The seminar topics were of interest to me.	0	0.0	0	0.0	0	0.0	**3**	**60.0**	**2**	**40.0**
6. Participating in the program helped to strengthen my desire for a career in cancer research.	0	0.0	**1**	**20.0**	0	0.0	**2**	**40.0**	**2**	**40.0**
7. The Program Director (Dr. Ford) was accessible and assisted me when needed.	0	0.0	0	0.0	0	0.0	**2**	**40.0**	**3**	**60.0**
8. The Program Coordinator (Dr. Cannady) was accessible and assisted me when needed.	0	0.0	0	0.0	0	0.0	**2**	**40.0**	**3**	**60.0**
9. My research mentor was accessible and assisted me when needed.	0	0.0	0	0.0	0	0.0	**1**	**20.0**	**4**	**80.0**
10. I would recommend this program to other students at my college/university.	0	0.0	0	0.0	0	0.0	0	0.0	**5**	**100.0**

Task 5 Deliverables: The Student Fellows gave a total of 6 scientific presentations. Currently, some of the Student Fellows will enter their junior or senior years of college and will begin applying to graduate or professional schools. Three Student Fellows have been accepted into Graduate/Professional Schools at Campbell University, the Medical University of South Carolina, and Alabama A&M University, respectively.

Plans to Accomplish Stated Goals for the Next Reporting Period

To accomplish the goals and objectives for the next reporting period, the Leadership Team will:

- Meet to confirm the activities for the next reporting period
    - Continue with monthly teleconferences and quarterly in-person meetings among the Leadership Team members
- Advertise and market the South Carolina Cancer Health Equity Consortium: HBCU Student Summer Training Program to faculty, students, and administrators at CU, SCSU, and VC in September 2016 – December 2016:
    - Circulate a recruitment flyer among the three partnering institutions
    - Post the flyer on each institution's website
    - Travel to each institution to make presentations to the faculty, students, and administrators regarding the available research training opportunities

    - Participate in organizational activities at each institution, such as student-led health meetings, to recruit students from the three partnering institutions to the Training Program
    - Participate in health fairs at the three partnering institutions to publicize the Training Program
- Open the application portal on the MUSC Hollings Cancer Center website in September 2016
- Meet with the Leadership Team in January to review the submitted applications in January 2017
- Notify selected students of their acceptance into the Training Program in February 2017, after students have confirmed their participation in the Training Program, submit documents to MUSC Enrollment Management and MUSC Human Resources to facilitate student matriculation at MUSC for the Training Program
- In February 2017, confirm speakers and dates for the Prostate Cancer Health Equity Course
- In February 2017, confirm the physicians, allied health care professionals, and HCC Shared Resource Core directors for the clinical, cultural, and biotechnical learning electives
- In March 2017, match students with Research Mentors

IMPACT/REPORTABLE OUTCOMES

Student Summer Research Summaries

The Training Program is playing a key role in training the next generation of cancer disparities researchers. Prior to this program, some of the Student Fellows had no experience in conducting cancer disparities research. The Training Program provides a wonderful opportunity for the students embrace careers in this arena.

The South Carolina Cancer Health Equity Consortium: HBCU Student Summer Training Program will help to address the problem of the gross underrepresentation of diverse students in the pool of US biomedical research scientists despite the fact that historically underrepresented groups are the most rapidly growing portion of the US population and experience a disproportionate burden of cancer morbidity and mortality.

The Prostate Cancer Health Equity Course and GRE training that are provided through the South Carolina Cancer Health Equity Consortium: HBCU Student Summer Training Program are expected to facilitate:

- The Student Fellows' entry into graduate degree programs
- The Student Fellows' transition from graduate programs to postdoctoral fellowships
- The Student Fellows' appointment in their first independent scientific positions
- The award of the Student Fellows' first independent research grants from the NIH or from an equivalent scientific source
- The Student Fellows' receipt of tenure awarded in an academic or non-academic setting

The Student Fellows who participated in the 2015 South Carolina Cancer Health Equity Consortium: HBCU Student Summer Training Program each prepared a research paper and gave a scientific presentation to his/her peers, mentors and other faculty at MUSC. Details regarding the manuscripts and scientific presentations developed by the Student Fellows are included in **Appendix D**. Ms. Ludy Martinez won a travel scholarship to present her summer research at the Annual Biomedical Conference for Minority Students in Seattle Washington. In addition, two students have matriculated/will matriculate into graduate/professional schools.

CHANGES/PROBLEMS

Due to the awarding of the grant in July 2015, during the summer 2015 South Carolina Cancer Health Equity Consortium: HBCU Student Summer Training Program, the clinical, cultural, and biotechnical learning opportunities were still being developed and will be offered during future summers.

PRODUCTS

Several products have resulted during the current grant award period. First, a prostate cancer research curriculum was developed. Second, inter-institutional relationships among the four partnering institutions (MUSC, CU, SCSU, and VC) were strengthened. Third, a cohort of **5** Student Fellows were trained to conduct cancer research. Fourth, the Student Fellows received formal instruction in the history and culture of the unique Sea Island/Gullah population of South Carolina. Fifth, during the reporting period, Ms. Ludy Martinez was awarded a travel scholarship to give an oral presentation at the 2015 Annual Biomedical Research Conference for Minority Students in Seattle Washington. Sixth, **3** of the **5** Student Fellows have since enrolled in graduate or professional schools, thus continuing their academic trajectory toward becoming established prostate cancer researchers. Seventh, several research mentors are writing manuscripts and will include their Student Fellows as co-authors, based on their substantial scientific contributions completed during their summer research training projects.

PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS

The individuals listed in the table below have worked on the project during the reporting period for at least one person month per year.

NAME	
Marvella E. Ford, PhD	No Change
Kimberly Cannady, PhD	No Change

In addition to the three partnering institutions – CU, SCSU, and VC – we have partnered with the Palmetto Medical, Dental, and Pharmaceutical Association. The list of partner organizations is below.

1.

Organization Name	Claflin University
Location of Organization	400 Magnolia Street Orangeburg, South Carolina 29115
Partner's Contribution to the Project	Collaboration

2.

Organization Name	South Carolina State University
Location of Organization	300 College Street NE Orangeburg, South Carolina 29115
Partner's Contribution to the Project	Collaboration

3.

Organization Name	Voorhees College
Location of Organization	481 Porter Drive Denmark, South Carolina 29042
Partner's Contribution to the Project	Collaboration

4.

Organization Name	Palmetto Medical, Dental, and Pharmaceutical Association
Location of Organization	South Carolina
Partner's Contribution to the Project	Other: In addition to the four partnering institutions, a new partner is the Palmetto Medical, Dental, and Pharmaceutical Association (PMDPA). This organization recently invited the Leadership Team to give a presentation describing the South Carolina Cancer Health Equity Consortium: HBCU Student Summer Training Program during their annual statewide convention. The PMDPA was established in 1896. It serves as South Carolina's auxiliary branch of the National Medical Association. In this capacity, the PMDPA provides seminars and workshops for diverse health care professionals to ensure that these professionals achieve their annual CME/CE requirements for continued certification. Additionally, the PMDPA maintains a strong focus on educating and training the next generation of diverse health care professionals. This mission overlays with the mission of the South Carolina Cancer Health Equity Consortium: HBCU Student Summer Training Program. Therefore, the leaders of the PMDPA have pledged to work with the Leadership Team to help identify applicants who could participate in future years of the South Carolina Cancer Health Equity Consortium: HBCU Student Summer Training Program.

SPECIAL REPORTING REQUIREMENTS

N/A.

CONCLUSIONS

During the past year of funding for the South Carolina Cancer Health Equity Consortium: HBCU Student Summer Training Program, the tasks outlined in the Statement of Work were successfully met. Four Student Fellows were recruited from CU, SCSU, and VC. Additional funds were leveraged to support one student from Voorhees College. Each Student Fellow conducted research and prepared a research paper that was presented at the conclusion of the program. These **5** Student Fellows are now trained to conduct cancer research and some are expected to be included as co-authors on future peer-reviewed scientific publications, based on their summer research.

Since the completion of Training Program, **3** of the **5** Student Fellows have since enrolled in graduate or professional schools. In addition, Ms. Ludy Martinez was awarded a travel scholarship to give an oral presentation at the 2015 Annual Biomedical Research Conference for Minority Students in Seattle Washington.

2015 Annual Report Appendices

Appendix A: 2015 Ernest E. Just Symposium Agenda

ERNEST E. JUST

Ernest Everett Just (1883–1941) was born and raised in a family of dockworkers in Charleston, SC. He left to prepare for college at the Industrial School of State College in Orangeburg and the Kimball Hall Academy, NH. Subsequently, he graduated in 1907 from Dartmouth College, magna cum laude, Phi Beta Kappa, with honors in botany, history, and sociology. That same year, Dr. Just accepted a teaching post at Howard University, where he later advanced to the rank of full professor and head of the Department of Physiology. In 1909, he served as a summer research assistant at the Marine Biological Laboratory at Woods Hole, MA. In 1915, his research attracted the attention of the National Association of the Advancement of Colored People, who conferred upon him the first Spingarn Medal, an annual prize given to an outstanding African-American. In 1916, Ernest Just received his PhD in experimental embryology, magna cum laude, from the University of Chicago, with a dissertation on the mechanics of fertilization. In 1919, he worked at the marine biological laboratories in Naples and Sicily.

Dr. Just's achievements earned him the role of adjunct researcher at the Kaiser Wilhelm Institute fur Biologie in Berlin-Dahlem (1920–1931) as the Julius Rosenwald Fellow in Biology of the National Research Council. A gift from the Rosenwald Fund to Just for $80,000 annually for several years offered him protected time for research and graduate teaching. So significant was his work that several of the crowned heads of Europe offered him use of their laboratories.

Dr. Just eventually returned to Woods Hole, where he spent almost twenty years at the research bench. In 1924, he was selected by leading German biologists to write a treatise on fertilization, one of a series of monographs by experts on cell structure and function.

Dr. Just coauthored General Cytology (published in 1924) and contributed to a series on colloid chemistry. He was vice president of the American Zoological Society, a member of the Ecological Society, National Research Council, and La Societe Nationale Des Sciences Naturelles Et Mathematiques, the founder of Omega Psi Phi and faculty advisor at Howard University (1911); Editor of Protoplasm, Biological Zoology, and Physiological Zoology; and a collaborator for Cytologia. In 1930, Dr. Just lectured at the 11th International Congress of Zoologists, Padua, Italy, basing his talk on his fifty published papers. In 1936, he spent three years on The Biology of the Cell Surface, a book summarizing his scientific observations. In 1939, early in WWII, Dr. Just was captured in France by Germans and held briefly in a prisoner-of-war camp. In 1940, he returned to the U.S. planning to resume teaching at Howard University. Unfortunately, an illness, which proved to be cancer, intervened and Dr. Just succumbed to his disease in 1941.

Thank you to our Sponsors:

MUSC Dept. of Regenerative Medicine, College of Graduate Studies, Office of the Provost, SC EPSCoR/IDeA, SC NASA Space Grant Consortium, College of Dental Medicine, College of Health Professions, College of Medicine, College of Pharmacy, College of Nursing, Avery Research Center for African American History and Culture (College of Charleston), U.S. Department of Energy, Mu Alpha Chapter of the Omega Psi Phi Fraternity, MUSC Hollings Cancer Center, NIH/NCI P20 SC CaDRe Grant

For more information contact:
Dr. Titus Reaves reaves@musc.edu
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Ernest E. Just Scientific Symposium
Medical University of South Carolina

Friday, February 27, 2015
110 Drug Discovery Auditorium

MUSC
MEDICAL UNIVERSITY of SOUTH CAROLINA

8:00-9:00 am	**Registration and Breakfast** Drug Discovery Lobby
9:00-9:10 am	**Opening** **Mark Sothmann, Vice President for Academic Affairs and Provost, MUSC** **Deborah Deas, M.D., Interim Dean, College of Medicine Professor of Psychiatry and Behavioral Sciences, MUSC** **Greeting** **Jacqueline McGinty, Ph.D.** **Interim Dean, College of Graduate Studies** **Professor of Neuroscience, MUSC**
9:10-9:40 am	***"The Ernest Path: The Grit and Determination of Dr. Just's Early Life"*** **Mary Just Adèr, M.P.H, M.P.P** Granddaughter of Ernest Everett Just Senior Advisor for Government Relations at Kaiser Permanente University of California Berkeley
9:40 – 10:20 am	**Just Symposium Keynote Speaker** ***"Computation-based Protein Engineering with Applications in the Life Sciences"*** **Stephen Mayo, Ph.D.** Bren Professor of Biology and Chemistry William K. Bowes Jr. Leadership Chair Division of Biology and Biological Engineering California Institute of Technology
10:20 – 10:35 am	**BREAK**
10:35– 11:00 am	***"To Connect or Not Connect: Understanding the Multifaceted Role of Beta 3 Intergrin in the Heart"*** **Dorea Pleasant, Ph.D. Candidate** Department of Medicine Division of Cardiology Medical University of South Carolina

Simon Conway, Ph.D., F.A.H.A

Dr. Simon Conway received his Ph.D. in Genetics from University College London and completed his postdoctoral studies at Great Ormond Street Children's Hospital, England. He has received several awards including a March of Dimes Starter Scholar, International Society for Heart Research Young Investigator, an IUPUI Outstanding Faculty and Staff, and is a Fellow of the American Heart Association, serves as a NHLBI Study Section Charter Member and sits on 4 editorial boards. He has published over 150 peer-reviewed articles and chapters relating to his research investigating the genetic, molecular and cellular causes of birth defects, premature birth, and approaches to prevent infant mortality. His basic research seeks to to uncover novel therapeutic approaches for the diagnosis and treatment of pediatric patients.

Erica Herzog, M.D., Ph.D.

Dr. Herzog received her Bachelor and M.D. degrees from the University of North Carolina at Chapel Hill. After completing her residency in Internal Medicine at Mount Sinai Medical Center in New York, New York, Dr. Herzog came to Yale to pursue a fellowship in Pulmonary and Critical Care Medicine. During this time she also obtained her Ph.D. in Investigative Medicine from Yale's Graduate School of Arts and Sciences. Following her graduation in 2005, Dr. Herzog became a faculty member in the Department of Internal Medicine in 2006, first as an Instructor and then as Assistant Professor. Dr. Herzog's laboratory focuses on the relationship between chronic inflammation, neuronal guidance proteins, and lung fibrosis in a variety of fibrosing lung diseases including IPF, scleroderma and sarcoidosis. Her work has been published in high impact journals including Science, Science Translational Medicine, American Journal of Respiratory and Critical Care Medicine, and FASEB Journal. She is the recipient of numerous awards including a Parker B. Francis Fellowship, the Mallinckrodt Award, and the Translational Research Award from the Department of Medicine at Yale.

Dorea Pleasant, Ph.D. Candidate

Dorea Pleasant earned her Bachelors of Science degree in Biology with a minor in Chemistry from Claflin University. While at Claflin she was a member of the Alice Carson Tisdale Honors College and ultimately graduated summa cum laude. Ms. Pleasant also went on to earn her Masters of Science from Claflin in Biotechnology, in 2010. Later that year she entered into the Biomedical Sciences Doctoral Program here at the Medical University of South Carolina. Her program of study is in Molecular and Cellular Biology and Pathobiology Program and her concentration is in Cardiovascular Biology. Ms. Pleasant is currently a graduate student in the laboratory of Dr. Dhan Kuppuswamy where her research is focused on understanding the molecular pathways behind the development of heart failure. While at MUSC she has served as the secretary, vice-president and president of the Multicultural Graduate Student Association (MGSA) and the secretary for Graduate Student Association. Additionally, Ms. Pleasant has presented her work at the American Heart Association Basic Cardiovascular Scientific Sessions and was awarded the Cardiovascular Outreach Award. She has also been awarded positions on the Initiative for Maximizing Student Development Program, Training to Improve Cardiovascular Therapies training grant and is currently a UNCF/Merck Research Dissertation Fellow and a 2014-2015 MUSC Provost Scholarship recipient.

Helen Blau, Ph.D.

Dr. Helen Blau received her B.A. from University of York in England and her M.A. and Ph.D. from Harvard University. She is currently the Donald E. and Delia B. Baxter Professor and Director of the Baxter Laboratory for Stem Cell Biology in the Microbiology and Immunology Department and the Stanford Institute for Stem Cell Biology and Regenerative Medicine in the Stanford University School of Medicine, Stanford, California. Dr. Blau's research area is regenerative medicine with a focus on stem cells. She is world renowned for her research on nuclear reprogramming and demonstrating the plasticity of cell fate using cell fusion. Her laboratory has also pioneered the design of biomaterials to mimic the in vivo microenvironment and direct stem cell fate. Her muscle heterokaryon experiments proved that silent muscle genes can be activated in diverse adult cells and that the differentiated state of a cell requires continuous regulation and is dictated by the balance of regulators present at any given time. Most recently, her lab used this cell fusion approach to define novel transient and early activators of reprogramming cells toward pluripotency.

11:00 -11:30 am **The E.E. Just Undergraduate Excellence in Research Presentations**

"Inhibitory Effect of Partial Decoupling Agents as an Alternative Therapy for Cancer"
Kareem Heslop
Claflin University
1st Place Recipient of The E.E. Just Undergraduate Award for Excellence in Research

"Personal Genome Evaluation: Health Professions Student Attitudes Toward Direct-to-Consumer Genetics Testing"
Rakish Taylor
Anderson University
2nd Place Recipient of The E.E. Just Undergraduate Award for Excellence in Research

11:30 – 12:30 pm Panel Discussion (questions and answers with speakers)

12:30 – 2:00 pm **BREAKOUT SESSIONS/LUNCH**
Campus tours for visiting students
Undergraduate Advisors meet with MUSC College Admissions Officers (Drug Discovery Bldg Rm 111)

BREAKOUT SESSIONS
Visiting students meet with MUSC College Admissions Officers:
College of Graduate Studies: Dr. Cynthia Wright – Bioengineering Building Rm 112
College of Medicine: Myra Haney Singleton and Wanda Taylor – Basic Science Bldg Rm 302
College of Dental Medicine: Pearl Givens – Basic Science Bldg Rm 120
College of Pharmacy: Christine Faye Ratliff – Pharmacy Building Rm QE 216
College of Nursing: Carolyn Page– Nursing Building Rm 221
College of Health Professions: Lauren Smith and Cami Taylor - CHP Bldg A Rm 204

2:00-3:00 pm *"Reprogramming Stem Cell Fate"*
Helen Blau, Ph.D.
Donald E. and Delia B. Baxter Foundation Professor
Director, Baxter Laboratory for Stem Cell Biology
Stanford University School of Medicine

3:00-4:00 pm *"Transgenic Mouse Modeling of Bronchopulmonary Dysplasia"*
Simon Conway, Ph.D., F.A.H.A
Professor of Pediatrics
Department of Anatomy & Cell Biology, Medical & Molecular Genetics, Biochemistry & Molecular Biology
Indiana University Simon Cancer Center Member
Indiana University School of Medicine

4:00-5:00 pm *"Role of Neuroimmune Molecules in Pulmonary Fibrosis"*
Erica Hertzog, M.D., Ph.D.
Associate Professor Medicine
Director, Translational Lung Research Program
Director, Interstitial Lung Disease Center of Excellence
Assistant Director, Medical Student Research
Yale School of Medicine

Mary Just Adèr, M.P.H, M.P.P.

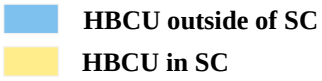
Mary Just Adèr is the youngest grandchild of Dr. Ernest Everett Just. Mary was raised in upstate New York and followed in her grandfather's footsteps by graduating from Dartmouth College in Hanover, New Hampshire with a Bachelor of Arts degree in psychology. Mary has a strong interest in public policy and a strong sense of responsibility. After graduating from Dartmouth, she moved to California to pursue graduate studies at the University of California Berkeley. She received two degrees, a Masters of Public Health and a Masters of Public Policy. Mary is an executive at Kaiser Permanente, one of the largest integrated health systems in America, with almost 10 million patients, 15,000 physicians and 50,000 nurses. Founded in 1945, Kaiser is based in Oakland, California and is made up of three distinct groups: the Kaiser Foundation Health Plan, Kaiser Foundation Hospitals, and the Permanente Medical Groups. Kaiser Permanente currently operates in eight states and the District of Columbia. Ms. Adèr serves as a Senior Advisor for Government Relations on state legislative issues in California, Georgia and Hawaii. Her areas of expertise include hospitals, health coverage expansion, public health and finance, occupational health, the safety net and Medicaid. Mary also serves as a volunteer advocate for a high school senior in foster care.

Stephen Mayo, Ph.D.

Dr. Stephen Mayo received his Ph.D. in Chemistry from California Institute of Technology, Pasadena, California. Dr. Mayo is the William K. Bowes Jr. Leadership Chair of the Division of Biology and Biological Engineering and Bren Professor of Biology and Chemistry at the California Institute of Technology in Pasadena, California. He has been a member of the Caltech faculty since 1992 and served as Vice Provost for Research from 2007 to 2010 before becoming Chair of the Division of Biology and Biological Engineering. In 2004, Dr. Mayo was elected as a member of the National Academy of Sciences for his pioneering contributions in the field of protein design. In March 2013, President Obama appointed him to the National Science Board. Dr. Mayo's research focuses on the development of computational approaches to protein engineering -- a field that has broad applications ranging from advanced biofuels to human therapeutics. He co-founded Molecular Simulations Inc. (currently Accelrys), a computational chemistry company, Xencor, a publicly traded bio-therapeutics company, and Protabit, a privately held protein engineering company.

Appendix B: 2015 Ernest E. Just Symposium Student Attendees

Schools that Participated in the 2015 Ernest E. Just Symposium	
Name of School	**# of Students**
Anderson University	17
Benedict College	13
Claflin University	19
Clark Atlanta University	24
Clemson University	17
Fayetteville State University	29
Francis Marion University	6
Morehouse College	11
Spelman College	16
University of Maryland Baltimore County	6
UNC Pembroke	2
USC Aiken	26
Winthrop	8
TOTAL	194



Appendix C: 2015 Student Supported from Leveraged Funding Sources

Summer 2015 South Carolina Cancer Health Equity Consortium: HBCU Student Summer Training Program Additional Student, Mentor, Funding Source, and Research Topic				
Student Name	**Academic Institution**	**MUSC Research Mentor**	**Funding Source**	**Research Topic**
Ms. Cheyauna Mitchell	Voorhees College	Victoria Findlay, PhD	MUSC Hollings Cancer Center	MicroRNA-mediated Negative Regulation of Caveolin-1 as a Mechanism Driving Breast Cancer Disparity

Appendix D: Summaries of Students' Scientific Research from the 2015 Summer Research Program

Kadeidre Gaymon
South Carolina State University
Mentor: Marvella E. Ford, PhD

ABSTRACT

Evaluating Rates of Overweight/Obesity and Physical Activity in a Diverse Sample of South Carolina Cancer Survivors

TARGET POPULATION: European American (EA) and African American (AA) women in South Carolina (SC)

BACKGROUND: High body mass index (BMI) is linked to poorer survival after cancer diagnosis. Physical activity (PA) could moderate this association.

OBJECTIVES/HYPOTHESIS: Prevalence of high BMI (overweight/obesity) and level of PA were evaluated in a statewide sample of women within 18 months of cancer diagnosis.

METHODS: A total of 388 women were identified and processed as potential participants SC Central Cancer Registry staff (Phase 1), of whom 178 (46%) opted into the study and were referred to MUSC study staff for Phase 2. Among these, 151 (84%) met all eligibility criteria and were interviewed: 101 African American and 50 European American women; among African Americans, 29 were Sea Islanders. Recruitment rates at the two Phases did not differ significantly by ethnicity (42% of African Americans and 54% of European Americans at Phase 1: p=0.11, and 87% and 81% respectively at Phase 2: p=0.28). Main reasons for non-participation at Phase 1 were passive refusal (not responding to repeated phone calls; n=87: 22%), actively opting out (n=70: 18%) and inability to contact the participant (incorrect or missing phone number; n=42: 11%). In Phase 2, a total of 26 passively or actively refused or did not complete the interview (15%). One woman was excluded as not meeting the ethnicity inclusion criterion.

RESULTS: *Age:* Age at diagnosis ranged from 38 to 90 years, with a mean age of 59.9 years (SD 12.1 years 1). The mean age of the African American participants was 3.9 years lower than the mean age of the European American participants. However, this difference was only marginally statistically significant (p=0.10).
Education: the majority of study participants (55%) reported having more than a high school diploma. No statistically significant racial differences were seen; 52% of African Americans and 64% of European Americans reported having more than a high school diploma (p=0.17).
BMI: The mean BMI level of the sample was 31.2 (SD 6.8, median 30.6, range 16.6-51.6). Average BMI levels were higher in African Americans than in European Americans (31.9 vs. 29.4, respectively (p=0.024). The majority of study participants (82%) were overweight/obese and this finding did not differ statistically by race (p=0.63). Among African Americans, 83% of the participants were overweight/obese (28% were overweight, 55% were obese, and 32% of these were extremely obese). Among European Americans, 79% of the participants were overweight/obese (36% were overweight, 43% were obese, and 19% of these were extremely obese).
PA and Age: In the entire sample, older women were more likely than younger women to report adhering to physical activity guidelines (OR 1.05/year, p=0.003). This difference was statistically significant for European Americans (p=0.012) but not for African Americans (p=0.09). *PA and Race:* European Americans reported higher levels of physical activity, with a median of 90 minutes per week, than African Americans, with a median of 45 minutes per week, although these median differences were not statistically significant (p=0.07). Physical activity was not significantly associated with reduced risk of overweight/obesity in either racial group, based on the CDC physical activity guidelines, even among physically active women (p>0.18 in an age-adjusted model). In addition, in age-adjusted models, no associations were seen between level of physical activity and education, disease stage or ER status in either racial group (p>0.22).

Casseanna Holmes
Voorhees College
Mentor: Danyelle Townsend, PhD

ABSTRACT

Impact of antioxidant enzymes on breast cancer patients: An evaluation of triple negative and receptor expression

There are two types of Hormone Receptor-Positive Breast Cancers. Estrogen Receptor Positive (ER positive) grows in the response to the hormone estrogen (1). Progesterone Receptor Positive (PR positive) breast cancer grows in the response of the hormone progesterone. Triple negative breast cancer test negative for three receptors: estrogen, progesterone, and HER2 (1). The objective was to see if Antioxidant enzymes are deregulated in triple negative breast cancer patients. Two different cell lines were used: MCF7 and MCF 10A. MCF7 cells are estrogen receptor positive and MCF 10A cells are normal epithelia cells. The following proteins were analyzed: glutathione S-transferase (GST-Pi), glutaredoxin-1 (GRX1), glutathione S-transferase Mu1 (GSTMu1), and peroxiredoxin (PRDX1). GST-Pi is down regulated in MCF7 while present in MCF 10A**.**

Malik Leach
Voorhees College
Mentor: David Turner, PhD

ABSTRACT

The Contribution to AGE-RAGE Signaling Pathways to Tamoxifen Resistance

Nolvadex or Soltamox also known as Tamoxifen is the most common prescribed drug treatment for the estrogen receptor positive (ER+) breast cancer which account for 70% of all the breast cancer cases. Tamoxifen blocks the ER receptor signaling pathways, thus creating a greater chance of survival. Many patients respond positively to Tamoxifen treatment but 50 % of the patients have de-novo resistance and 30% of original responders acquire resistance. The goal of this proposal is to examine if reactive metabolites associated with poor lifestyle can contribute to resistance to Tamoxifen therapy in immortalized ER+ breast cancer cell lines. My objective of this study is to find out if AGE is dependent on its cognate receptor "RAGE" to promote Tamoxifen resistance

Ludy Martinez
Claflin University
Mentor: Shikhar Mehrotra, PhD

ABSTRACT

The Immunosuppressive Ability of Myeloid Derived Suppressor Cells

The development of treatments to combat cancer has been researched extensively. Immunology is a relatively new field of research that has shown a promising future in cancer treatment. Immunology implicates immunotherapy which uses a patient's own immune cells to fight diseases, remarkably in cancer. Myeloid Derived Suppressor Cells (MDSCs), most notably in cancer, are generated during pathological diseases and suppress the function of immune cells. With MDSCs suppressing the function of immune cells it is difficult for immunotherapy to work effectively because the functions of immune cells are being compromised. Myeloid Derived Suppressor Cells use a series of pathways and mechanisms to induce immune cell apoptosis and inhibit their antigen specific response. The mechanisms that MDSCs use to suppress the function of immune cells are being targeted in efforts to make immune cells responsive to immunotherapy. To target the pathways MDSCs it must first be shown that MDSCs suppress the function of the immune cells, T cells, but also suppress their proliferation. In order to demonstrate this suppression MDSCs were first generated from the bone marrow of a C57BL/6 mouse and cultured in the presence of Granulocyte Macrophage-Colony Stimulating Factor (GM-CSF) and Interleukin-6 to promote MDSC expansion. T cells were then extracted from the splenocytes of the mouse so that the effect on proliferation could be observed. A suppressive assay with the generated and extracted cells was then set up in ratios of 1:1, 1:2, and 1:5, MDSCs to T cells, with Carboxyfluorescein succinimidyl ester (CFSE), a dye measuring proliferation. After three days of incubation the cells were stained with fluorochromes labeled with CD4 and CD8 antibodies to distinguish the two types of T cells. The proliferations of T cells alone were then measured as a control for both types of T cells. Then the proliferations of the different ratios of MDSCs to T cells were measured. The results concluded that in the presence of MDSCs not only was the proliferation of T cells suppressed but the amount of MDSCs present also affected the amount the T cells proliferated. Having the knowledge that Myeloid Derived Suppressor Cells Suppress the proliferation of T cells, the next step is to inhibit the pathways of MDSCs that cause T cells to be unresponsive and induce T cell apoptosis in strides to making immunotherapy a more effective treatment for cancer.

Appendix E: Academic Accomplishments to Date of the 2015 Student Fellows

Year of Program Participation: 2015 ❖ These are the most recent student fellows that participated in the 2015 SURP program. Additional accomplishments are expected to occur during the course of the next few years following their participation.					
Student Name	**Summer Research Project**	**Funding Source**	**Publications and Presentations**	**GRE Status**	**Graduate School Admission**
Ms. Kadeidre Gaymon SC State University	**Mentor:** Marvella E. Ford, PhD **Research Project:** Evaluating Rates of Overweight/Obesity and Physical Activity in a Diverse Sample of South Carolina Cancer Survivors	Department of Defense (HBCU)	**Publication:** No publications to date **Presentation:** 2015 MUSC Summer Undergraduate Research Program		Graduated from South Carolina State University Will start the Accelerated Nursing Program at MUSC in the Fall 2016
Ms. Casseanna Holmes (Dual Year Participant 2014/2015) Voorhees College	**Mentor:** Danyelle Townsend, PhD **Research Project:** Impact of antioxidant enzymes on breast cancer patients: An evaluation of triple negative and receptor expression	Department of Defense (HBCU)	**Publication:** No publications to date **Presentation:** 2015 MUSC Summer Undergraduate Research Program	Has taken the GRE	Graduated from Voorhees College. Attends Campbell University – PhD in Pharmaceutical Sciences
Mr. Malik Leach Voorhees College	**Mentor:** David Turner, PhD **Research Project:** The Contribution of AGEs to Tamoxifen Resistance	Department of Defense (HBCU)	**Publication:** No publications to date **Presentation:** 2015 MUSC Summer Undergraduate Research Program		Still enrolled at Voorhees College
Ms. Ludy Martinez Claflin University	**Mentor:** Dr. Shikhar Mehrotra **Research Project:** The immunosuppressive Ability of Myeloid Derived Suppressor Cells on T cells	Department of Defense (HBCU)	**Publication:** No publications to date **Presentation:** 2015 MUSC Summer Undergraduate Research Program **Honors and Awards:** Oral Presentation at 2015 ABRCMS. Received full travel award Savannah River Nuclear Solutions Scholarship Recipient		Still enrolled at Claflin University
Student Supported by Leveraged Funding Sources					
Student Name	**Summer Research Project**	**Funding Source**	**Publications, Presentations and Honors**	**GRE Status**	**Graduate School Admission**
Ms. Cheyauna Mitchell Voorhees College	**Mentor:** Victoria Findlay, PhD **Research Project**: Micro-RNA Mediated Negative Regulation of Caveolin-1 as a Mechanism Driving Breast Cancer Disparity	MUSC Hollings Cancer Center	**Publication:** No publications to date **Presentation:** 2015 MUSC Summer Undergraduate Research Program	Has taken the GRE	Graduated from Voorhees College Attends Alabama A&M. Master's Degree in Biology, concentration in Physiology

Appendix F: SC CHEC Mentor Program Evaluations

SC CHEC MENTOR PROGRAM EVALUATIONS

Evaluation Questions for SC CHEC Mentors

We would like to have your opinion of the SC CHEC program so that we may evaluate and strengthen it for the future. Please complete the questions below and return the survey to the program coordinator. *(Please circle your response)*

1. How would you rate the SC CHEC program?

   excellent very good good poor

2. How would you describe the quality of your experience as a participant in the SC CHEC program?

   excellent very good good poor

3. Would you volunteer to serve as a SC CHEC mentor again next year or in the future?

   yes possibly not sure no

4. Did the SC CHEC mentor orientation session help you prepare for your mentoring experience?

   yes somewhat not sure no

5. Would you have liked additional training for mentors?

   yes maybe probably not no

6. How clearly defined were your mentor responsibilities?

   very clear moderately clear a little unclear very unclear

7. The SC CHEC program coordinators were accessible and easy to talk to and seek advice from when necessary.

   always somewhat not much never

8. How would you describe your relationship with your mentee?

   very good good fair poor

9. Do you think that the time you spent with your mentee was sufficient?

   yes almost not really no

10. Do you think that the time you spent together was helpful for your mentee?

yes somewhat not really no

11. Did you gain personally from this relationship?

yes somewhat not much no

12. I would have preferred to meet less often with my mentee.

yes sometimes rarely no

13. I would have preferred to meet more often with my mentee.

yes sometimes rarely no

14. What was most satisfying about the SC CHEC program?

15. What was least satisfying about the SC CHEC program?

16. What would you suggest to improve the SC CHEC program?

Courtesy of Mass Mentoring Partnership, *Mentoring A-Z Training Manual*.